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5 January 1967

MEMORANDUM FOR: Assistant for Technical Development, NPIC

SUBJECT: Gear failure problem with [redacted] RT-12 Processor 25X1

On 29 December I was asked by [redacted] to look into the subject gear problem. 25X1

Since the gear train is subjected to temperatures up to 140°F. I placed the crossover assembly in an oven and heated it to that temperature. No significantly adverse effects resulted. Gears did not bind and the large drive roller increased in diameter only 0.002 inch.

Calculations showed that this small increase in roller diameter would cause it to try to pull one inch more film per hundred feet than when at ambient temperature. I felt this was negligible but attempted to verify it by an actual test run. Surprisingly, we found the differential to be one inch every two feet of film travel.

This was determinded as follows. A long length of 9-inch film was threaded through the processor. Then a free loop was pulled out at the entrance to the crossover. The film was marked where it emerged from the dryer at both the beginning and end of the run. The length of the run was thus measured as 46 feet. During the run the free loop was kept under slight tension by means of a hand-held free-turning roller. The loop length decreased 11 inches during the run. Therefore, 22 inches more film was demanded by the dryer than was supplied by the processor. This is a ratio of approximately 1 inch in 2 feet.

This over-drive situation is intolerable at present because the dryer is trying to pull the film faster than the processor is supplying it, thus stretching the film tightly between these two sections. The longer the length of film the tighter the stretch until something has to give. Since the film cannot slip easily on the transporting rollers, and since the plastic gears are apparently the weakest link, the resultant forces are acting to strip the teeth of those gears.

We did reduce the diameter of the drive roller in the crossover and a secondrun of 24 feet showed no improvement. Apparently the entire dryer drive is at fault.

CONCLUSION

Considering that I have devoted only a few hours thus far to this investigation, I am not in a position to draw a firm conclusion. If I had to make a recommendation at this time it would be that the dryer

DDR-Dupe

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should continue to be over-driven by some small amount and that some torque limiting device, such as a slip clutch, should be inserted in the power drive train to the dryer section. This would insure against mechanical damage due to over-driving and at the same time insure against film looping and tangling which would occur if the dryer were under-driven.

[redacted] 25X1

Exploratory Development Laboratory, TDS

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